

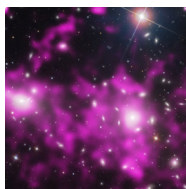


Serving the Marshall Space Flight Center Community www.nasa.gov/centers/marshall/about/star/index.html October 23, 2013

Inside This Issue:

Clues to the Growth of
the Colossus in Coma

page 3



Mighty Eagle Successfully
Tests New Landing
Software in Series of Flights

page 5



Check us
out online!
Scan the
QR code



Marshall Space Flight Center, Alabama 35812
256-544-0030
<http://www.nasa.gov/centers/marshall>

The Marshall Star is published every Wednesday by the Public and Employee Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. The Star does not publish commercial advertising of any kind.

Manager of Public and Employee
Communications: Dom Amatore
Editor: Jenalane Rowe

Marshall Center Leaders Address Workforce, Express Gratitude, Optimism

By Rick Smith

On Oct. 18, Marshall Space Flight Center Director [Patrick Scheuermann](#) and other center leaders addressed members of the workforce -- the morning after the NASA team returned to their duties along with other federal workers furloughed during the U.S. government shutdown, which lasted from Oct. 1 to Oct. 16.

Scheuermann welcomed team

See Leaders to Workforce on [page 2](#)



Marshall Center Director Patrick Scheuermann, center, addresses members of the Marshall Center workforce during the Oct. 18 All Hands meeting, as Steve Cash, left, director of Marshall's Safety & Mission Assurance Directorate, and Tereasa Washington, director of the Office of Human Capital, look on. (MSFC/Emmett Given)

Fulfilling Potential: Marshall's Sheila McDonald Now on the Giving End of Charity

By Bill Hubscher

Nearly 30 years ago, a young girl was told she would be separated from her family and placed in a Huntsville children's shelter. It was the best thing that could have happened to her.

Sheila McDonald, a program analyst with the Mission Operations Lab at NASA's Marshall Space Flight Center,

See McDonald Gives Back on [page 4](#)



members back to work during the All Hands meeting, held in Morris Auditorium in Building 4200 and broadcast on [DesktopTV](#). Joining him to talk about post-shutdown activities and answer workers' questions were Steve Cash, director of Marshall's Safety & Mission Assurance Directorate; Tereasa Washington, director of the Office of Human Capital; Marshall Chief Financial Officer Bill Hicks; and Bobby Watkins, director of the Office of Strategic Analysis & Communications.

Praising Marshall workers' "perseverance" in uncertain times, Scheuermann also thanked the 34 team members who remained on full-time duty, monitoring mission-critical operations aboard the [International Space Station](#) and elsewhere across the center. He acknowledged the hundreds more who remained on call throughout the shutdown, ready to support center activities at a moment's notice.

Our 'most important resource'

Scheuermann and Cash spoke at length about the need to go cautiously in the days ahead, keeping safety first as organizations get back up to speed on a variety of projects and activities. They also counseled a need for greater awareness of other team members' moods and behavior.

"It's been a stressful time," Cash said. "The most important thing you can do is take care of your team, build them up, be there for them."

"The most important resource we have is the team," he added. "If you see someone who's having a hard time, get them to the right people for help."

Scheuermann introduced [Dr. Terry Sterry](#), Marshall's [Employee Assistance Program](#) coordinator, and urged team members to contact him as needed.

Answering key questions

The Marshall leaders also introduced a "[Government Reopening Information](#)" Web presence, launched in the wake of the shutdown to answer workers' questions about its impact on their jobs, pay and benefits.

Watkins encouraged team members to talk first to their supervisors, but if unanswered questions remain, workers can email them to the leadership team via a [special email address](#). It can also be used to share feedback about how Marshall handled the shutdown and kept workers informed, he said. Answers to these common questions will be published on the "Government Reopening" page to benefit all team members.

Marshall team members can find both the Web page and email link on the [Inside Marshall](#) home page, placed prominently in the righthand column.

Continuing the work of the nation

Scheuermann stressed that the work of the center goes on -- notably high-profile activities tied to science and payload operations support for the International Space Station, and to keep the [Space Launch System](#) and the [James Webb Space Telescope](#) on target for launch to space in 2017 and 2018, respectively.

All three are national priorities, Scheuermann told the All Hands audience. Their importance to NASA's mission of exploration and discovery leave him "optimistic," he said, about the center's future.

"Nothing's changed at Marshall," he said. "Hold onto the fact that we still have the clarity of mission that we had before."

Smith, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.

Clues to the Growth of the Colossus in Coma

From news release

A team of astronomers has discovered enormous arms of hot gas in the Coma cluster of galaxies by using NASA's Chandra X-ray Observatory and the European Space Agency's XMM-Newton. These features, which span at least half-a-million light years, provide insight into how the Coma cluster has grown through mergers of smaller groups and clusters of galaxies to become one of the largest structures in the universe held together by gravity.

A new composite image, with Chandra data in pink and optical data from the Sloan Digital Sky Survey appearing in white and blue, features these spectacular arms. In this image, the Chandra data has been processed so extra detail can be seen.

The X-ray emission is from multimillion-degree gas and the optical data shows galaxies in the Coma cluster, which contains only about one-sixth the mass in hot gas. Only the brightest X-ray emission is shown here, to emphasize the arms, but the hot gas is present over the entire field of view.

Researchers think that these arms were most likely formed when smaller galaxy clusters had their gas stripped away by the head wind created by the motion of the cluster through the hot gas, in much the same way that the headwind created by a roller coaster blows the hats off riders.

Coma is an unusual galaxy cluster because it contains not one, but two giant elliptical galaxies near its center. These two giant elliptical galaxies are probably the vestiges from each of the two largest clusters that merged with Coma in the past. The researchers also uncovered other signs of past collisions and mergers in the data.

From their length, and the speed of sound in the hot gas (about four million km/hr), the newly discovered X-ray arms are estimated to be about 300 million years old, and they appear to have a rather smooth shape. This gives researchers some clues about the conditions of the hot gas in Coma. Most theoretical models expect that mergers between clusters like those in Coma will produce strong turbulence, like ocean water that has been churned by many passing ships. Instead, the smooth shape of these lengthy arms points to a rather calm setting for the hot gas in the Coma cluster, even after many mergers.



Large-scale magnetic fields are likely responsible for the small amount of turbulence that is present in Coma. Estimating the amount of turbulence in a galaxy cluster has been a challenging problem for astrophysicists. Researchers have found a range of answers, some of them conflicting, and so observations of other clusters are needed.

Two of the arms appear to be connected to a group of galaxies located about two million light years from the center of Coma. One or both of these arms connects to a larger structure seen in the XMM-Newton data, and spans a distance of at least 1.5 million light years. A very thin tail also appears behind one of the galaxies in Coma. This is probably evidence of gas being stripped from a single galaxy, in addition to the groups or clusters that have merged there.

These new results on the Coma cluster, which incorporate over six days worth of Chandra observing time, appeared in the Sept. 20, 2013, issue of the journal *Science*.

NASA's Marshall Space Flight Center manages the Chandra Program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass.

McDonald Gives Back *Continued from page 1*

was only 14 when her family was broken up and she moved into the Harris Home for Children, which provides foster care for at-risk adolescents.

“I didn’t have a normal pre-teen life,” McDonald says. “I spent most of my time taking care of my seven younger siblings. It was traumatic when our family was forced to separate, but the people at Harris Home showed that, finally, there was someone looking out for me. The group of girls I was placed with had good house parents who scheduled regular doctor and dentist appointments, assigned us chores, made sure we did our homework, taught us how to cook and had us attend church regularly. It was a normal family environment that every child should have.”

The Harris Home did more than put a roof over her head. The home and the people who took care of her there showed McDonald a foundation for a better life.

“In fact, I call them my four foundations: hope, security, independence and peace,” McDonald says. “Hope for my future, creating a safe home, learning to stand on my own and peace in my heart through my faith. I am doing my best to build on this foundation in my own home and inspire others who may have been in a similar situation.”

Her story serves as an example of strength and compassion to her own two young daughters. But McDonald now extends that beyond her front door by supporting the mission of the Harris Home as a board member, helping provide foster care, therapy and educational services to children. She constantly searches for volunteering opportunities in the community, including providing hot meals for Meals-on-Wheels and working with the homeless at the Salvation Army.

“I can’t put a price tag on what Harris did for me,” says McDonald, who began her NASA career as a co-op student in 1992, receiving her secretarial science technology degree from Drake State Technical College in Huntsville in 1995. “I know how valuable a fostering environment can be, so I do everything I can to help others and encourage

them to make a change for the better. There’s no better feeling.”

The Harris Home for Children, founded in 1957 by Chessie and George Harris, is one of many charitable organizations Marshall team members can help during this year’s Combined Federal Campaign, or CFC. With the fundraising goal set at \$700,000, there are a lot of dreams and needs the Marshall workforce can help make possible by the time the drive is scheduled to end in December.

“Donations and volunteers are essential to keeping organizations like the Harris Home functional,” says McDonald. “As a child, I couldn’t see the donations or understand what volunteers provided, but we felt the love all around us.”

CFC organizers are accepting reservations for scheduled bus tours to give team members the chance to visit local charities. Marshall personnel are also invited to volunteer at local non-profit groups during Community Service Days. A complete list of the various charities, with times and dates available, can be found on [ExplorNet in the CFC group page](#).

The CFC mission is to support and promote philanthropy, giving all employees an opportunity to improve the quality of life for all. Marshall’s fundraiser is part of the annual Tennessee Valley Combined Federal Campaign, a joint effort between the Marshall Center, other federal agencies at Redstone Arsenal, and in surrounding Alabama and Tennessee counties.

Hubscher, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.

Mighty Eagle Successfully Tests New Landing Software in Series of Flights

By Shannon Ridinger

The Mighty Eagle may be small, but it has definitely lived up to its “mighty” name. The robotic lander, a prototype developed and managed out of NASA’s Marshall Space Flight Center, successfully completed a test flight on Sept. 20 designed to evaluate Guidance, Navigation and Control (GNC) software from Moon Express Inc., along with a new hazard avoidance system designed and developed at the Marshall Center.

This flight was part of a series occurring at the Marshall Center that began in late August. The data that is gained from this series will be used by Moon Express to help validate its GNC flight software designed to tell the vehicle where to go and how to get there. Under the terms of a Reimbursable Space Act Agreement signed with Moon Express, the Marshall Center is providing the Mighty Eagle and its engineering team support in a series of test flights to help validate the GNC flight software. Guidance algorithms developed by Moon Express will be integrated into the existing software on board the Mighty Eagle and used to perform the flight test series. In return, Moon Express is reimbursing the Marshall Center for the cost of providing the test vehicle and technical support.

In addition, the series is also evaluating a new hazard avoidance system designed and developed by engineers at the Marshall Center. This avoidance hazard system will search for obstacles or hazards like rocks or boulders so that it can steer the vehicle away from those places.



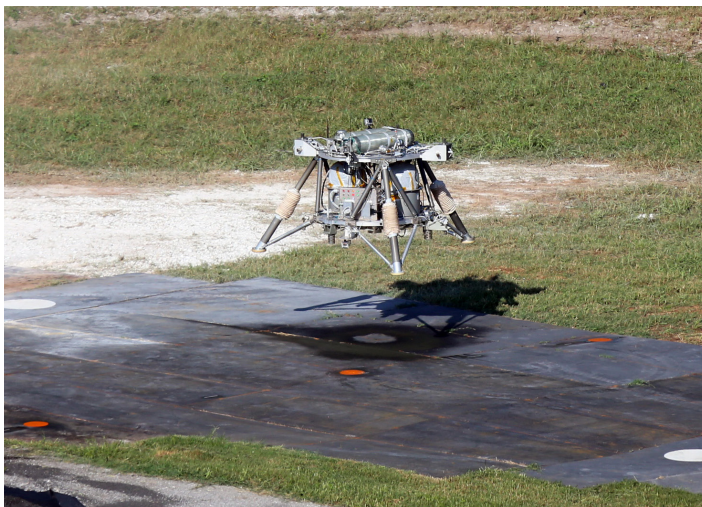
The Mighty Eagle flies high above the simulated celestial body field that was built to test the hazard avoidance system designed by Marshall engineers. (NASA/MSFC/Todd Freestone)

“We are really proud of how the vehicle has performed during our latest test series,” said Erick Ordonez, lead systems engineer for the Mighty Eagle at the Marshall Center. “We’ve been able to gather data about the innovative hazard avoidance system our team designed, and also partner with Moon Express to help them evaluate their software. It’s been a great experience all around.”

NASA will use the Mighty Eagle and its larger counterpart, the Project Morpheus prototype lander, to mature the technology needed to develop a new generation of small, smart and versatile robotic landers capable of achieving scientific and exploration goals on the surface of planetary bodies.

The Mighty Eagle prototype lander was developed by the Marshall Center and John Hopkins University Applied Physics Laboratory in Laurel, Md., for NASA’s Planetary Sciences Division, Headquarters Science Mission Directorate. Key partners in this project include the Von Braun Center for Science and Innovation, which includes the Science Applications International Corporation, Dynetics Corp. and Teledyne Brown Engineering Inc., all of Huntsville.

Ridinger is a public affairs officer in the Office of Strategic Analysis & Communications.



The Mighty Eagle hits the mark upon its landing after a beautiful flight. (NASA/MSFC/Todd Freestone)

93 Beat the Station as it Completes One Earth Orbit During Racin' the Station Duathlon!

It was the race heard from space. Expedition 37 astronaut Karen Nyberg, via a TV hookup from high up in the International Space Station, welcomes racers to the 2nd annual Racin' the Station Duathlon on Sept. 28. A total of 188 duathlon participants tied their shoes and pumped air into bike tires in their effort to beat the space station as it orbited the Earth in 91 minutes, 12 seconds. By the time the orbiting laboratory completed a full circle, 93 racers crossed the finish line after running for 1.95 miles, biking for 14.3 miles and running again for 1.95 miles. The event -- sponsored by the [Team Rocket Tri Club](#), along with the Marshall Association to support the Marshall Association Scholarship Fund -- began at the Marshall Space Flight Center's Activities Building. (NASA/MSFC/Emmett Given)



Ready, set, go! And these runners are off to “beat the station” before it completes one Earth orbit. Later, at the finish line, coming in at first place was Alex Clark, spouse of a Redstone Arsenal employee; second was Matt Mansell of the Engineering Directorate; and third was Jason Sucic, a member of the Team Rocket Tri Club. To view all the results, including the kids’ races, visit [here](#). For more information about the sponsoring Marshall Association, and for details on how to join, visit [here](#). Learn about upcoming association luncheons in the Marshall Star. (NASA/MSFC)

Obituaries

Sam L. Davis, 84, of Huntsville, died Sept. 23. He retired from the Marshall Center in 1994 as an aerospace engineer. He is survived by his wife, Esther Davis.

Stewart A. Finley, 83, of Huntsville, died Sept. 25. He retired from the Marshall Center in 1989 as an electronics engineer. He is survived by his wife, Janis Finley.

Alfred “Jack” Burks, 93, of Huntsville, died Sept. 26. He retired from the Marshall Center in 1986 as an aerospace engineer. He is survived by his wife, Grace Burks.

Billy H. Neighbors, 83, of Birmingham, died Oct. 3. He retired from the Marshall Center in 1995 as an electronics engineer. He is survived by his wife, Joyce Best Neighbors.

J.B. Pendergraft, 81, of Huntsville, died Oct. 18. He retired from the Marshall Center in 1974 as an aerospace engineer. He is survived by his wife, Betty Hughes Pendergraft.